REMARKS

Reconsideration of this application is requested.

Claims 1-14 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner requested that the claims be amended to clarify the sequence in which the heating temperatures and partial pressures occur.

It is believed that the amendments to the claims submitted herewith render the claims definite within the meaning of §112.

The Examiner also objected to claims 5 and 11 for specific reasons which have been obviated by the amendments thereto.

Claims 1-14 were rejected under 35 U.S.C. §102(e) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over the Li et al. U.S. patent no. 5,798,318 and claim 14 was rejected under 35 U.S.C. §102(b) as being anticipated by or in the alternative obvious under 35 U.S.C. § 103(a) over the Dorris et al. U.S. patent no. 5,468,566.

It should be noted by the Examiner that the Dorris et al. '566 patent relied on by the Examiner includes Victor Maroni, a co-inventor herein. Dr. Dorris is employed by Argonne National Laboratory as is Dr. Victor Maroni.

Perhaps the best way to develop the proper understanding of the differences among the two references and the present application is to outline the process for producing silver sheathed $(Bi,Pb)_2Sr_2Ca_2Cu_3O_y$ (aka BSCCO or Bi-2223) composite superconductor (referred to hereinafter as Ag/Bi-2223). The stages of processing are as follows:

Stage 1. Preparation of the precursor powder. This stage involves composing the mix of Bi, Pb, Sr, Ca, and Cu that gets packed in the silver billets used to produce Ag/Bi-2223 in wire form. It needs to be understood that this precursor is not yet the Bi-2223 phase; it get converted to the Bi-2223 phase during subsequent stages of the process.

Stage 2. Conversion of the precursor-packed billet to wire. This stage involves drawing of the packed billet into long length wire and rolling of the round, long-length extrusion product to produce a flat wire.

Stage 3. The first heat treatment. The purpose of the first heat treatment (called HT-1 hereinafter) is to convert most, but not all, of the precursor to Bi-2223.

Stage 4. The intermediate size reduction. In this stage of the process the flat wire from Stage 3 is rolled to re-densify the ceramic core prior to the second heat treatment (HT-2) which is Stage 5.

Stage 5. The second heat treatment. The purpose of HT-2 is to complete the conversion of the precursor to Bi-2223. Ideally, only Bi-2223 should exist in the silver sheath after HT-2.

Stage 6. The post-formation heat treatment. The purpose of this treatment is, as stated in the Li et al. '318 patent, to improve the connectivity of the Bi-2223 grains that are present at the end of HT-2 (Stage 5).

Referring to the Li et al. '318 patent and the Dorris et al. '566 patent, and the present application, the Li et al. '318 patent deals only and exclusively with Stage 6. The Li et al. '318 patent is solely descriptive of treatments performed after Stage 5. To be more specific, The Li et al. '318 patent has nothing to do with Stage 3, as the temperatures used in the Li et al. '318 patent are all between 500°C and 800 °C.

The teachings of the Dorris '566 patent relate primarily to Stage 1 in that they describe particular precursor formulation methodology. Dorris '566 patent requires that Stage 2 be performed, but uses standard methods for drawing and rolling and teaches nothing about how to do so. Dorris '566 also requires that Stage 3 be performed, but again uses standard methods and conditions and teaches nothing about how to do so. In fact, the Dorris '566 patent mentions alternative sets of conditions for HT-1 namely (1) 810°C to 825° in 8% O_2 or (2) 830°C to 845° in air which is nominally 20% O_2. Again, the emphasis of the Dorris et al. '566 patent is on the "two-powder" precursor method, as stated therein (see claim 4).

The teachings of the present application relate solely to Stage 3 (HT-1). The present invention is the only example where more than one temperature and more than one oxygen pressure are employed during HT-1. As described in the present application, during HT-1, the phases present at any time during the reaction are changing and evolving with time. The way the phases change and evolve depends on the temperature and the oxygen pressure used. The heat treatment sequence described in the present application is designed to force the precursor reaction to proceed in a manner that minimizes the size of the nonsuperconducting phases

evolving along with the Bi-2223 phase. At the end of HT-1, one wants to have a ceramic core that consists of the already partially formed plates of Bi-2223 interspersed with residual nonsuperconducting second phases (in essence the unreached residue) that are sub-micrometer in size. The reason for this is that large nonsuperconducting second phases present after HT-1 cause irreversible damage to the Bi-2223 plate when rolling operation of Stage 4 is performed. The damage done during the Stage 4 rolling operation by large nonsuperconducting second phases is impossible to heat during Stage 5 and Stage 6. It is also noteworthy that:

1. The Li et al. '318 patent says nothing at all about Stage 3 (HT-1 conditions), whereas the present application says nothing at all about Stage 6 conditions;

2. The present application deals with Stage 3 at temperatures above 810°C whereas the Li et al. n'318 patent deals with Stage 6 at temperatures less than or equal to 800°C.

3. The Dorris et al. '566 patent seeks to convert 100% of the precursor to Bi-2223 leaving no nonsuperconducting second phases after Stage 5 (HT-2); The Dorris et al. '566 patent says nothing about what happens during
Stage 3 (HT-1); the present application recognizes that nonsuperconducting second phases are present after Stage 3 (HT-1) and after Stage 5 as well, but those nonsuperconducting second phases become much smaller when the teachings of the present invention are employed.

4. The Dorris et al. '566 patents teaches about the composition of the

precursor; the present case is independent of the composition of the precursor for the range of composition that are in the stability field of Bi-2223.

Careful reading of the Li et al. '318 patent and the Dorris et al. '566 patent shows that they have nothing at all to say about the teachings of the present invention. In fact, each of the Li et al. '318 patent and Dorris et al. '566 patent and the present invention relates to a different stage of the Ag/Bi-2223 manufacturing process.

Accordingly, it is respectfully suggested that each of the claims presented is definite within the purview of §112 and is patentable in view of either the Li et al. '318 patent or the Dorris et al. '566 patent. More particularly, it is respectfully suggested that the claims as now presented completely define over the references relied upon by the Examiner in that the references do not relate to the initial heating step and none of the references remotely show or suggest the relationship between the temperature and partial pressure set forth in the claims as now presented.

All matters having been addressed, this application is believed to be allowable and the Examiner is requested to pass this application and each claim therein to issue.

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Respectfully submitted,

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